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LETTER TRANSMITTING CHANGES TO FINAL RESOURCE CONSERVATION AND RECOVERY ACT FACILITY INVESTIGATION WORK PLAN ZONES C AND I DATED 24 JANUARY 1996 CNC CHARLESTON SC
1/24/1996
NAVFAC SOUTHERN

2903-07150

DEPARTMENT OF THE NAVY
CHARLESTON NAVAL SHIPYARD
CHARLESTON, S.C. 29408-6100

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2 JAN 1996

Mr. G. Randall Thompson
Director, Division of Hazardous and Infectious Waste Management
Bureau of Solid and Hazardous Waste Management
South Carolina Department of Health and Environmental Control
2600 Bull Street
Columbia, SC 29201

RE: RCRA FACILITY INVESTIGATION ZONE WORKPLAN CHANGES

Dear Mr. Thompson:

The purpose of this letter is to request approval for revisions to RCRA Facility Investigation (RFI) Zone Workplans for the Charleston Naval Base Complex. The changes are required for various reasons which are described below.

Changes to the *Final Zone C RCRA Facility Investigation Workplan* are provided in Enclosure (1). Two sites are being added to the investigation: AOC 522, which was inadvertently omitted during workplan preparation, and AOC 700, which was discovered after the approval date of the workplan. Additional changes were made to correct typographical errors. A record of changes and filing instructions are provided in Enclosure (1).

Changes to the *Final Zone I RCRA Facility Investigation Workplan* are provided in Enclosure (2). One site is being added to the investigation, SWMU 177. This site was inadvertently omitted during workplan preparation. A record of changes and filing instructions are provided in Enclosure (2).

It is requested that the SCDHEC review the changes and provide approval for incorporation as Revision 1 to Zone C and I workplans. If you have any questions, please contact Amos Webb at (803) 743-5519.

Sincerely,

R L Laney

R. L. LANEY
Director, Occupational Safety,
Health and Environmental Office

Encl:
(1) Zone C RFI Workplan Change Pages
(2) Zone I RFI Workplan Change Pages

12 4 JAN 1996

Copy to:
SCDHEC (Bowers)
COMANVBASE (N4BEC, Dearhart, Fontenot, Brittain)
SOUTHNAVFACENGCOM (Hunt, Stockmaster)
E/A&H

Blind copy to (w/o encl):
106DF, 106.2, 106.2x

Copy to:
SCDHEC (Bowers)
COMANVBASE (N4BEC, Dearhart, Fontenot, Brittain)
SOUTHNAVFACENGCOM (Hunt, Stockmaster)
E/A&H

FILING INSTRUCTIONS

The following is a list of pages in the *Final Zone C Work Plan, dated February 24, 1995*, that have been revised. The obsolete pages presently in your binders are listed in the column headed "Remove." New and replacement pages are listed in the column headed "Replace." Please file this instruction cover sheet preceding the Table of Content of *Final Zone C Work Plan*.

If you have any questions, please call 803-884-0029.

List of Changes/Revisions	**Remove Pages**	**Replace Pages**
Table of Contents - updated.	i - vi	i - viii
Section 2.0 — Added Sections 2.7 and 2.8	—	2-59 - 2-70
Section 2.0 - Text change.	2-10, 2-19, 2-26 2-32, 2-38 & 2-45	Same as removed
Section 4.0 — Added Section 4.8A and 4.8B	—	4-18a — 4-18f

Enclosure (1)

Record of Changes to the Final Zone C RFI Work Plan Naval Base Charleston		
Page(s)	**Change/Revision**	**Reason for Change**
i-vi	Table of Contents: Entire TOC including Acronym List resubmitted.	Table of Contents had to be revised to incorporate the addition of Sections 2.7, 2.8, 4.8A, and 4.8B.
2-10, 2-19, 2-26, 2-32, 2-38 & 2-45	Under the matrix column of the table " was changed to ' .	Change made to indicate feet.
2-59 to 2-70	Addition for two site descriptions and investigative approaches: Sections 2.7 and 2.8.	Include two sites requiring either a CSI or RFI in the investigation.
4-18a to 4-18f	Addition for two Site Specific Heath and Safety Plans: Sections 4.8A and 4.8B.	Include two sites requiring either a CSI or RFI in the investigation.

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ACRONYM LIST

ACGIH	American Conference for Governmental Industrial Hygienists
AL	Action Level
AOC	Areas of Concern
bgs	Below Ground Surface
BOD	Biological Oxygen Demand
CAMP	Corrective Action Management Plan
CEC	Cation Exchange Capacity
CFR	Code of Federal Regulations
CGI	Combustible Gas Indicator
CHASP	Comprehensive Health and Safety Plan
CLEAN	Comprehensive Long-Term Environmental Action Navy
CMS	Corrective Measure Study
CNSY	Charleston Naval Shipyard
COD	Chemical Oxygen Demand
COPC	Contaminants of Potential Concern
CRZ	Contaminant Reduction Zone
CSI	Confirmatory Sampling Investigation
DOD	Department of Defense
DQO	Data Quality Objective
E/A&H	EnSafe/Allen & Hoshall
EM	Electro Magnetic
EPA	Environmental Protection Agency
EZ	Exclusion Zone
HAZWOPER	Hazardous Waste Workers and Emergency Response
IDLH	Immediately Dangerous to Life and Health
LEL	Lower Explosive Limit
MSDS	Material Safety Data Sheet
ug/gm	micrograms per gram
NAVBASE	Naval Base Charleston
NFI	No Further Investigation
NIOSH	National Institute for Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
PCB	Polychlorinated Biphenyl
PEL	Permissible Exposure Limit
PHSO	Project Health and Safety Officer
PID	Photoionization Detector
PPE	Personal Protective Equipment
ppm	Parts Per Million
PRG	Preliminary Remedial Goals

PWC	Public Works Center
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
REL	Recommended Exposure Limit
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
SAR	Supplied Air System
SCBA	Self-contained Breathing Apparatus
SCDHEC	South Carolina Department of Health and Environmental Control
SHSO	Site Health & Safety Officer
SOUTHDIV	Southern Division
STEL	Short-Term Exposure Limit
SVOA	Semivolatile Organics Analysis
SWMU	Solid Waste Management Unit
SZ	Support Zone
TBD	To Be Determined
TCLP	Toxic Characteristic Leachate Procedure
TIC	Tentatively Identified Compounds
TLV	Threshold Limit Value
TOC	Total Organic Compound
TSS	Total Suspended Solid
UST	Underground Storage Tank
VOA	Volatile Organic Analysis
VOC	Volatile Organic Compound
ZCHASP	Zone C Health and Safety Plan

Table 2-3
SWMU 44
Sampling Plan

Matrix	Quantity	Analysis
Soil (0-1' bgs)	8	Metals and Cyanide
Soil (3'-5' bgs)	8	
Groundwater (shallow wells)	8	Grain size and total organic carbon (sediment).
Sediment	14	
Surface Water	14	General water quality standards (surface water).

Engineering Parameters:

Slug tests will be performed on two of the shallow wells. While installing the wells, Shelby tubes will be collected when lithology changes significantly. Samples will be tested for permeability, grain size, porosity, total organic carbon (TOC) and cation exchange capacity (CEC). Analysis for any of the remaining design parameters listed in Appendix C will be performed at selected locations when a better understanding of the contamination distribution (if contamination is present) is developed.

Notes:

Groundwater monitoring wells will be sampled quarterly for one year.

A leachability test will be conducted on a sample from the coal pile.

The quantities presented are estimated numbers of samples believed to be needed to fulfill the objectives of the investigation. Expansion of the investigation may be necessary to meet the stated objectives.

All analysis to be performed per SW-846 except where other methods are specified. Data Quality Objective (DQO) Level III analysis as specified in the sampling plan will be used, with a minimum of 10% duplicates analyzed for all Appendix IX constituents at DQO Level IV. Duplicates will be collected at the locations where contaminants are most likely to be present. The sample quantities presented do not include Quality Assurance/Quality Control (QA/QC).

The soil boring and groundwater monitoring well locations are proposed for the inner and outer perimeters of the anticipated migration pathways. Four soil borings to be completed as groundwater monitoring wells will be located on each side, directly adjacent to the coal pile. These sampling locations will be used to confirm if COPCs derived directly from the coal pile are present. Four additional soil borings completed as groundwater monitoring wells will be oriented on the west and northwest side of the coal pile adjacent to the surface water runoff ditches, which are also the site boundaries. These borings and wells will confirm the presence of COPCs deposited and/or having the possibility of migrating offsite.

Table 2-5
AOC 516 (Including SWMU 47)
Sampling Plan

Matrix	Quantity	Analysis
Soil (0-1' bgs) Soil (3'-5' bgs) Groundwater (shallow wells)	17 17 15	VOA, SVOA w/ Tentatively Identified Compounds (TICs), Metals, Cyanide, Pesticides, TPH and Polychlorinated biphenyls (PCBs).

Engineering Parameters:

Slug tests will be performed on 25% of the shallow wells. While installing the wells, Shelby tubes will be collected when significant changes in lithology occur. Samples will be tested for permeability, grain size, porosity, TOC, and CEC. Analysis for any of the remaining design parameters listed in Appendix C will be performed at selected locations when a better understanding of the contamination distribution (if contamination is present) is developed.

Notes:

Groundwater monitoring wells will be sampled quarterly for one year.

The quantities presented are estimated numbers of samples believed to be needed to fulfill the objectives of the investigation. Expansion of the investigation may be necessary to meet the stated objectives.

All analysis to be performed per SW-846 except where other methods are specified. DQO Level III analysis, as specified in the sampling plan will be used, with a minimum of 10% duplicates analyzed for all Appendix IX constituents at DQO Level IV. Duplicates will be collected at the locations where contaminants are most likely to be present. The sample quantities presented do not include QA/QC samples.

2.3.5 Objectives

The goal of the CSI is to classify the site as requiring No Further Investigation (NFI) or an RFI by using DQO Level III or IV data to determine whether contaminants are present. If an RFI is required, the objective of field investigations shall be to fill the identified data gaps by delineating the horizontal and vertical extent of any soil and groundwater contamination as well as the rate of contaminant migration at the sites. Data collection efforts shall support the technical evaluation of identified remedial options.

2.3.6 Screening Alternatives

No sampling has been conducted to determine COPCs, therefore, selecting a screening alternative would be premature. If the proposed collection of high-quality samples is inadequate to define the extent of contamination (if present), the feasibility of employing screening methods will be reevaluated. While collecting all soil boring samples, soil samples will be screened for VOCs with a PID. All screening results will be recorded in field notebooks and boring logs.

2.3.7 Sampling and Analysis Plan

To fulfill the CSI objectives, the following site-specific sampling and analysis requirements have been proposed. Two soil borings will be placed inside the suspected boundaries of the former building locations and one on each of the sides, 25 feet away. This sampling scheme will confirm whether COPCs are present relating to the former buildings. The length of time since operation and the shallow depth to groundwater enables the use of soil borings only to determine whether COPCs are present. Because soil gas has been identified as a migration pathway, a PID will be used to screen all borings and soil samples. Table 2-7 summarizes the types of samples to be collected and analytical parameters to be used. Proposed sampling locations for AOCs 508 and 511 are illustrated in Figure 2-4. All sampling will adhere to the NAVBASE *Final Comprehensive RFI Work Plan*.

Table 2-7
AOC 508 (Including AOC 511)
Sampling Plan

Matrix	Quantity	Analysis
Soil (0-1' bgs) Soil (3'-5' bgs)	12 12	VOA, SVOA w/ TICs, Metals, Cyanide, Pesticides, TPH and PCBs

Engineering Parameters:

Selected soil samples will be tested for permeability, grain size, porosity, TOC, and CEC.

Notes:

The quantities presented are estimated numbers of samples believed to be needed to fulfill the objectives of the investigation. Expansion of the investigation may be necessary to meet the stated objectives.

All analysis to be performed per SW-846 except where other methods are specified. DQO Level III analysis as specified in the sampling plan will be used, with a minimum of 10% duplicates analyzed for all Appendix IX constituents at DQO Level IV. Duplicates will be collected at the locations where contaminants are most likely to be present. The sample quantities presented do not include QA/QC samples.

investigations shall be to fill the identified data gaps by delineating the horizontal and vertical extent of any soil and/or groundwater contamination as well as the rate of contaminant migration at the sites. Data collection efforts will also support the technical evaluation of identified remedial options.

2.4.6 Screening Alternatives

No sampling has been conducted to determine COPCs, therefore, selecting a screening alternative would be premature. If the proposed collection of high-quality samples is inadequate to define the extent of contamination (if present), the feasibility of employing screening methods will be reevaluated. However, while collecting all soil boring samples, soil samples will be screened for VOCs with a PID. All screening results will be recorded in field notebooks and boring logs.

2.4.7 Sampling and Analysis Plan

To fulfill the CSI objectives, the following site-specific sampling and analysis requirements have been proposed. Two soil borings will be placed inside the suspected boundaries of the former buildings and one on each of the sides, 25 feet away. This sampling scheme will determine whether COPCs are present relating to the former buildings. The length of time since operation and shallow depth to groundwater enables the use of soil borings only to determine whether COPCs are present. Because soil gas is identified as a potential migration pathway, a PID will be used to screen all borings and soil samples. Table 2-9 summarizes the types of samples to be collected and analytical parameters to be used. Proposed sampling locations for AOCs 515 and 519 are illustrated in Figure 2-5. All sampling will adhere to the NAVBASE *Final Comprehensive RFI Work Plan.*

Table 2-9
AOC 515 (Including AOC 519)
Sampling Plan

Matrix	Quantity	Analysis
Soil (0-1' bgs) Soil (3'-5' bgs)	12 12	VOA, SVOA w/ TICs, Metals, Cyanide, Pesticides, TPH, and PCBs

Engineering Parameters:

Selected soil samples will be tested for permeability, grain size, porosity, TOC, and CEC.

Notes:

The quantities presented are estimated numbers of samples believed to be needed to fulfill the objectives of the investigation. Expansion of the investigation may be necessary to meet the stated objectives.

All analysis to be performed per SW-846 except where other methods are specified. DQO Level III analysis as specified in the sampling plan will be used, with a minimum of 10% duplicates analyzed for all Appendix IX constituents at DQO Level IV. Duplicates will be collected at the locations where contaminants are most likely to be found. The sample quantities presented do not include QA/QC samples.

at the sites. The remaining objective will be to establish the presence/absence, number of, and location of USTs. Data collection efforts shall also support the technical evaluation of identified remedial treatment options.

2.5.6 Screening Alternatives

No sampling has been conducted to determine COPCs, therefore, selecting a screening alternative would be premature. If the proposed collection of high-quality samples is inadequate to define the extent of contamination (if present), the feasibility of employing screening methods will be reevaluated. While collecting all soil boring samples and installing all monitoring wells, samples will be screened for VOCs using a PID. All screening results will be recorded in field notebooks and boring logs.

2.5.7 Sampling and Analysis Plan

To fulfill the CSI objectives, the following site-specific sampling and analysis requirements have been proposed. Two soil borings, which will be completed as groundwater monitoring wells, will be located just outside the south and east perimeters of Building 198. The placement of the first well, south of the building, was chosen because it is the closest feasible location to the site and it is upgradient of the anticipated easterly flow of groundwater. The remaining well will be placed downgradient, east of Building 198, to define whether COPCs are present relating to AOC 523.

The soil borings will occur directly on the area with suspected COPCs. Investigative measures to determine the presence/absence of USTs will be conducted by a location specialist under the direction of E/A&H personnel. Because soil gas is identified as a potential migration pathway, a PID will be used to screen all borings and soil samples. Table 2-11 summarizes the types of samples to be collected and analytical parameters to be used. Proposed sampling locations for AOC 523 are illustrated in Figure 2-6. All sampling will adhere to the NAVBASE *Final Comprehensive RFI Work Plan*.

Table 2-11
AOC 523 (Including SWMU 49)
Sampling Plan

Matrix	Quantity	Analysis
Soil (0-1' bgs)	4	VOA & SVOA w/ TICs, Metals, Cyanide, Pesticides, TPH, and PCBs.
Soil (3'-5' bgs)	4	
Groundwater	2	

Engineering Parameters:

Slug tests will be performed on 25% of the shallow wells. While installing the wells, Shelby tubes will be collected when lithology changes significantly. Samples will be tested for permeability, grain size, porosity, TOC, and CEC.

Notes:

Groundwater monitoring wells will be sampled quarterly for a year.

The quantities presented are estimated numbers of samples believed to be needed to fulfill the objectives of the investigation. Expansion of the investigation may be necessary to meet the stated objectives.

All analysis to be performed per SW-846 except where other methods are specified. DQO Level III analysis as specified in the sampling plan will be used, with a minimum of 10% duplicates analyzed for all Appendix IX constituents at DQO Level IV. Duplicates will be collected at the location where contaminants are most likely to be found. The sample quantities presented do not include QA/QC samples.

Table 2-13
Other Sites Designated CSI
Sampling Plan

Matrix	Quantity	Analysis
Soil (0-1' bgs)	28	VOA & SVOA w/ TICs, Metals, Cyanide, Pesticides and PCBs.
Soil (3'-5' bgs)	28	
Groundwater wells (shallow)	2	

Engineering Parameters:

Slug tests will be performed on one of the shallow wells. While installing the wells, Shelby tubes will be collected when lithology changes significantly. Samples will be tested for permeability, grain size, porosity, TOC and CEC.

Notes:

Groundwater monitoring wells will be sampled quarterly for one year.

The quantities presented are estimated numbers of samples believed to be needed to fulfill the objectives of the investigation. Expansion of the investigation may be necessary to meet the stated objectives.

Samples will be taken of the residue in the pit, if present, at AOC 510.

Floor and roof wipe samples will be taken at the former indoor range, AOC 517.

All analysis to be performed per SW-846 except where other methods are specified. DQO Level III analysis, as specified in the sampling plan will be used, with a minimum of 10% duplicates analyzed for all Appendix IX constituents at DQO Level IV. Duplicates will be collected at locations where contaminants are most likely to be found. The sample quantities presented do not include QA/QC samples.

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2.7 AOC 522, Former Grease and Wash Building

AOC 522 is the site of former Building 1252, a grease and wash building, located at the southeast corner of Building 198, near the loading docks. This site has been designated for a CSI. Table 2-14 describes the site.

Table 2-14
AOC 522
Site Information and Description

Number	Description	Materials Generated or Stored	Potential Pathways
AOC 522 FORMER BUILDING 1252	Former building 1252 was a small garage-type structure used for vehicle maintenance in the early 1950s. It was located adjacent to the present Building 198 shipping and receiving warehouse. No visible evidence of the building remains today, and the area is now mainly covered by asphalt.[a]	Lead Paint Solvent Anti-freeze Battery acid Degreasing solvents Petroleum hydrocarbons (VOA, SVOA, and Metals)	Air **Soil** Soil Gas Groundwater Surface Water

Notes:
[a] Described in the *Final RCRA Facility Assessment*, Vol. II, June 1995
Pathways scheduled for sampling are bold.

2.7.1 Previous Investigations

This site has not been investigated previously.

2.7.2 Treatment Alternatives

Because there are no environmental media data, treatment alternatives for this site cannot be evaluated.

2.7.3 Data Gaps

Currently no environmental media data have been collected to characterize this site or to support detailed evaluation of treatment alternatives, if necessary. To ensure data collection efforts are sufficient to meet the stated investigative objectives, the following data gaps have been identified and will be resolved:

- There are currently no data to establish whether COPCs are present for any of the potential migration pathways; and,

- No data exist to support a detailed evaluation of treatment alternatives, if necessary.

2.7.4 Potential Receptors

Potential receptors that may be exposed to site contaminants include current land users, such as NAVBASE personnel, and any future users this area may support following closure. Data will be generated during the investigation to determine the level of risk to the spectrum of current and potential future receptors, including any highly sensitive individuals within the population, who may be exposed through invasive or non-invasive activities. Sampling will characterize the potential pathways bolded in Table 2-14.

Land around this site is paved parking areas. Potential receptors are site workers or other land users involved with invasive and non-invasive activities bringing them in direct contact with subsurface contaminants. Considering the shallow depth to groundwater, generally less than 4 feet bgs, site workers could also be subject to accidental ingestion or dermal exposure to contaminated groundwater.

The utility system in this area could act as a conduit for moving any product released at this facility, and thus could expose those working on any of these underground systems. The underground utility system will be investigated in the Zone L work plan.

2.7.5 Objectives

The goal of the CSI is to classify the site as NFI or RFI by using DQO Level III or IV data to determine whether COPCs are present. If an RFI is required, the objective of field investigations shall be to fill the identified data gaps by delineating the horizontal and vertical extent of any soil and/or groundwater contamination as well as the rate of contaminant migration at the sites. Data collection efforts shall also support the technical evaluation of identified remedial options.

2.7.6 Screening Alternatives

No sampling has been conducted to determine COPCs, therefore, selecting a screening alternative would be premature. If the proposed collection of high-quality samples is inadequate to define the extent of contamination (if present), the feasibility of employing screening methods will be reevaluated. While collecting all soil boring samples and installing all monitoring wells, samples will be screened for VOCs using a PID. All screening results will be recorded in field notebooks and boring logs.

2.7.7 Sampling and Analysis Plan

To fulfill the CSI objectives, the following site-specific sampling and analysis requirements have been proposed. Table 2-15 summarizes the types of samples to be collected and analytical parameters to be used. Proposed sampling locations for AOC 522 are illustrated in Figure 2-13.

Due to the general lack of information regarding this site, proposed sample locations, as illustrated, represent the areas most likely to have been impacted if a release has occurred. The number of samples and sample locations for the above-listed AOCs are based on what is reasonably expected to provide adequate information to identify the presence of COPCs. All sampling will adhere to NAVBASE *Final Comprehensive RFI Work Plan.*

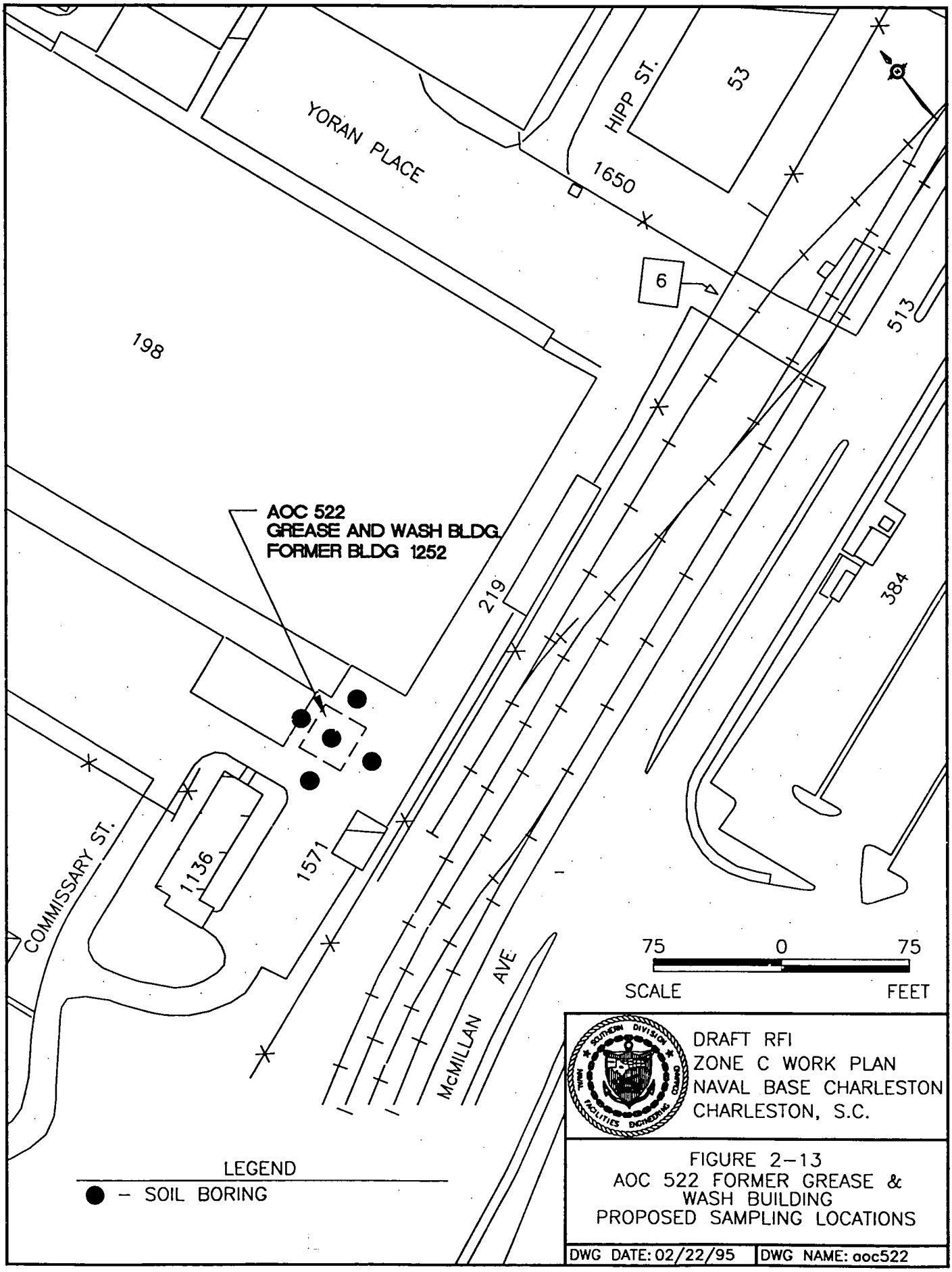
Table 2-15
AOC 522
Sampling Plan

Matrix	Quantity	Analysis
Soil (0-1' bgs) Soil (3'-5' bgs)	5 5	VOA & SVOA w/ TICs, Metals, Cyanide, Pesticides and PCBs.

Notes:

The quantities presented are estimated numbers of samples believed to be needed to fulfill the objectives of the investigation. Expansion of the investigation may be necessary to meet the stated objectives.

All analysis to be performed per SW-846 except where other methods are specified. DQO Level III analysis, as specified in the sampling plan will be used, with a minimum of 10% duplicates analyzed for all Appendix IX constituents at DQO Level IV. Duplicates will be collected at locations where contaminants are most likely to be found. The sample quantities presented do not include QA/QC samples.


YORAN PLACE
HIPP ST.
53
1650
6
513
198
AOC 522
GREASE AND WASH BLDG.
FORMER BLDG 1252
219
384
COMMISSARY ST.
1136
1571
McMILLAN AVE
75 0 75
SCALE FEET
LEGEND
● – SOIL BORING
DRAFT RFI
ZONE C WORK PLAN
NAVAL BASE CHARLESTON
CHARLESTON, S.C.
FIGURE 2–13
AOC 522 FORMER GREASE &
WASH BUILDING
PROPOSED SAMPLING LOCATIONS
DWG DATE: 02/22/95
DWG NAME: aoc522

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2.8 AOC 700, Golf Course Maintenance Building

AOC 700 is the site of a golf course maintenance building, Building 1646, located west of Avenue "D" and north of Hunt Street. This site has been designated for an RFI. Table 2-16 describes the sites.

Table 2-16
AOC 700
Site Information and Description

Number	Description	Materials Generated or Stored	Potential Pathways
AOC 700 GOLF COURSE MAINTENANCE BUILDING	This structure was built in 1975. It has been used for lawnmower storage and repair and pesticide storage and mixing. The building is no longer being used and all chemicals and equipment have been removed.[a]	Acids Solvents Herbicides Pesticides Petroleum Hydrocarbons (VOA, SVOA, Pesticides, Herbicides and Metals)	Air **Soil** Soil Gas Groundwater Surface Water

Notes:
[a] Described in the *Final RCRA Facility Assessment*, Vol. V, June 1995
Pathways scheduled for sampling are bold.

2.8.1 Previous Investigations

This site has not been investigated previously. However, several areas of dark soil were observed on the west and northwest sides of the building. Stressed and dead vegetation was also observed on the west, north and northwest sides of the building.

2.8.2 Treatment Alternatives

As outlined in the overall sampling strategy in the *Final Comprehensive RFI Work Plan*, treatment alternatives are being identified for each site likely to require remediation. Data collection efforts will support evaluating these alternatives. Table C-4 (Appendix C) lists treatment alternatives for groundwater; Table C-5 lists treatment alternatives for soil; Table C-6

lists treatment alternatives for the presence of soil gas. Alternatives presented here are for preliminary evaluation only.

2.8.3 Data Gaps

Currently no environmental media data have been collected to characterize this site or to support detailed evaluation of treatment alternatives, if necessary. To ensure data collection efforts are sufficient to meet the stated investigative objectives, the following data gaps have been identified and will be resolved:

- The nature and extent of impact to environmental media (soil, soil gas and groundwater) from the suspected releases has not been defined.

- No data exist to support a detailed evaluation of treatment alternatives, if necessary.

2.8.4 Potential Receptors

Potential receptors that may be exposed to site contaminants include current land users, such as NAVBASE personnel, and any future users this area may support following closure. Data will be generated during the investigation to determine the level of risk to the spectrum of current and potential future receptors, including any highly sensitive individuals within the population, who may be exposed through invasive or non-invasive activities. Sampling will characterize the potential pathways bolded in Table 2-16.

Land around this site range from grassy areas to asphalt. Potential receptors are site workers or other land users involved with invasive and non-invasive activities bringing them in direct contact with subsurface contaminants. Considering the shallow depth to groundwater, generally less than 4 feet bgs, site workers could also be subject to accidental ingestion or dermal exposure to contaminated groundwater.

Runoff patterns, drainage ditches and runoff accumulation areas provide a possible contaminant route to Noisette Creek, approximately 600 feet away. These avenues may result in the exposure to biological receptors other than humans.

The utility system in this area could act as a conduit for moving any product released at this facility, and thus could expose those working on any of these underground systems. The underground utility system will be investigated in the Zone L work plan.

2.8.5 Objectives

The objective of field investigations is to fill the identified data gaps by establishing whether contaminants are present in the identified migration pathways. If COPCs are detected, the horizontal and vertical extent and rate of any soil contamination will be delineated concurrently. Data collection efforts shall also support the technical evaluation of identified remedial options.

2.8.6 Screening Alternatives

No sampling has been conducted to determine COPCs, therefore, selecting a screening alternative would be premature. If the proposed collection of high-quality samples is inadequate to define the extent of contamination (if present), the feasibility of employing screening methods will be reevaluated. While collecting all soil boring samples and installing all monitoring wells, samples will be screened for VOCs using a PID. All screening results will be recorded in field notebooks and boring logs.

2.8.7 Sampling and Analysis Plan

To fulfill the objectives, the following site-specific sampling and analysis requirements have been proposed. Table 2-17 summarizes the types of samples to be collected and analytical parameters to be used. Proposed sampling locations for AOCs 700 are illustrated in Figure 2-14.

Due to the general lack of information regarding this site, proposed sample locations, as illustrated, represent the areas most likely to have been impacted if a release has occurred. The number of samples and sample locations for the above-listed AOCs are based on what is reasonably expected to provide adequate information to identify the presence of COPCs. All sampling will adhere to NAVBASE *Final Comprehensive RFI Work Plan.*

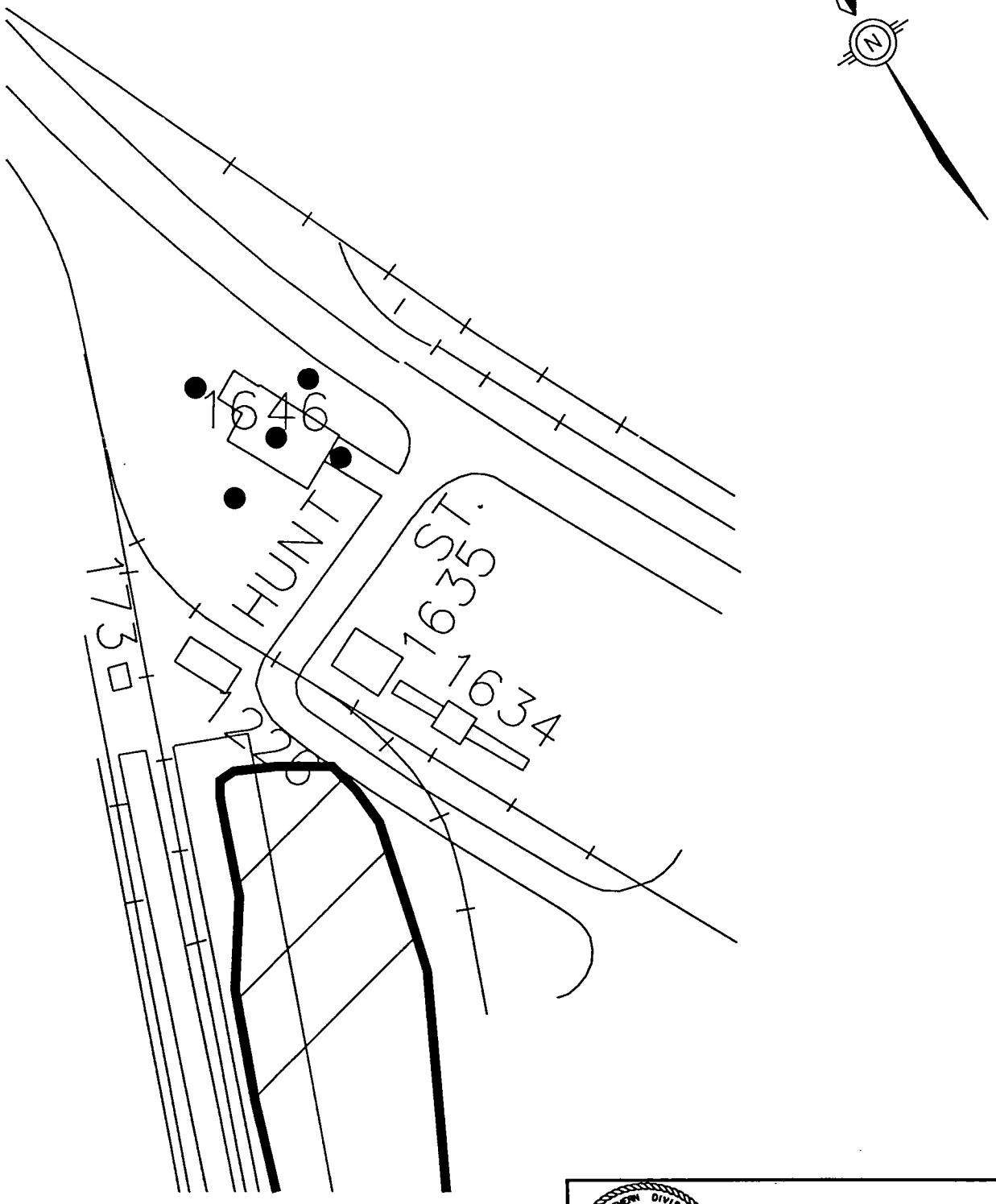
Table 2-17
AOC 700
Sampling Plan

Matrix	Quantity	Analysis
Soil (0-1' bgs) Soil (3'-5' bgs)	5 5	VOA & SVOA w/ TICs, Metals, Cyanide, Pesticides, Herbicides and PCBs.

Notes:

The quantities presented are estimated numbers of samples believed to be needed to fulfill the objectives of the investigation. Expansion of the investigation may be necessary to meet the stated objectives.

All analysis to be performed per SW-846 except where other methods are specified. DQO Level III analysis, as specified in the sampling plan will be used, with a minimum of 10% duplicates analyzed for all Appendix IX constituents at DQO Level IV. Duplicates will be collected at locations where contaminants are most likely to be found. The sample quantities presented do not include QA/QC samples.



LEGEND

● – SOIL BORING

75 0 75

SCALE FEET

DRAFT RFI
ZONE C WORK PLAN
NAVAL BASE CHARLESTON
CHARLESTON, S.C.

FIGURE 2–14
AOC 700
GOLF COURSE MAINTENANCE BLDG.
PROPOSED SAMPLING LOCATIONS

DWG DATE: 02/22/95 | DWG NAME: aoc700

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4.8A AOC 522, Former Grease and Wash Building

AOC 522 is the site of former Building 1252, a grease and wash building, located at the southeast corner of Building 198, near the loading docks. This site has been designated for a CSI. Table 4-9a describes the

site.

Table 4-9a
AOC 522
Site Information and Description

Number	Description	Materials Generated or Stored
AOC 522 FORMER BUILDING 1252	Former building 1252 was a small garage-type structure used for vehicle maintenance in the early 1950s. It was located adjacent to the present Building 198 shipping and receiving warehouse. No visible evidence of the building remains today, and the area is now mainly covered by asphalt.[1]	Lead Paint Solvents Ethylene Glycol Sulfuric Acid Degreasing Solvents Petroleum Hydrocarbons

Notes:
[1] Described in the *Final RCRA Facility Assessment*, Vol. II, June 1995

Site Activities

Site activities will include coring, soil borings, and soil sampling. Field work for this site is described in Section 2.7 of this Work Plan.

Chemical Hazards and PPE Requirements

The COPCs at these sites include ethylene glycol, lead, paints, solvents, sulfuric acid, and petroleum hydrocarbons. Table 4-9b lists exposure guidelines for contaminants of concern. This site has not been investigated previously. If additional contaminants of concern are discovered during the investigation, MSDSs will be immediately obtained, reviewed, and incorporated into the ZCHASP.

The initial PPE level for invasive field activities performed at this AOC will be modified Level D. The AL for this site is a continuous PID reading of 5 ppm or greater in the breathing zone. If this occurs, the required PPE level shall be upgraded to Level C.

Table 4-9b
Exposure Guidelines For Expected Site Chemical Hazards - AOC 522

Chemical Name	Odor[a] Threshold	OSHA PEL[b]	ACGIH TLV[c]	NIOSH REL[d]	Auto-ignition Temp.(°F)	Flammable range (% by volume)
Acetone	100	750 ppm 1000 ppm STEL	750 ppm 1000 ppm STEL	250 ppm	869	2.6 to 12.8%
Benzene	4.68 ppm	1 ppm 5 ppm STEL	0.1 ppm Confirmed Human Carcinogen	0.1 ppm 1 ppm STEL Potential Occupational Carcinogen	1097	1.3 to 7.1%
Ethylbenzene	140 ppm	100 ppm 125 ppm STEL	100 ppm 125 ppm STEL	N.A.	860	1.0 to 6.7%
Ethylene Glycol	N.A.	50 ppm - Ceiling	50 ppm - Ceiling	N.A.	751.8	3.2 to 15.3%
Kerosene	1	N.A.	N.A.	100 mg/m^3	444	0.7 to 5%
Lead	N.A.	0.05 mg/m^3	0.05 mg/m^3	0.1 mg/m^3	N.A.	N.A.
Methylene Chloride	214	500 ppm 1000 ppm Ceiling	50 ppm Suspected Human Carcinogen	Potential Occupational Carcinogen	1184	12 to 19%
Methyl Ethyl Ketone	10	200 ppm 300 ppm STEL	200 ppm 300 ppm STEL	200 ppm 300 ppm STEL	960	1.8 TO 11.5%
Sulfuric Acid	N.A.	1 mg/m^3	1 mg/m^3 3 mg/m^3 - STEL	1 mg/m^3	N.A.	N.A.
Tetraethyl Lead	N.A.	0.075 mg/m^3 - Skin	0.1 mg/m^3 - Skin	<0.1 mg/m^3	229.8	1.8 to ?%
Trichloroethylene	0.5 to 176	50 ppm 200 ppm STEL	50 ppm 200 ppm STEL	25 ppm	770	11 to 41%

Table 4-9b
Exposure Guidelines For Expected Site Chemical Hazards - AOC 522

Chemical Name	Odor[a] Threshold	OSHA PEL[b]	ACGIH TLV[c]	NIOSH REL[d]	Auto-ignition Temp.(°F)	Flammable range (% by volume)
Toluene	40 ppm	100 ppm 150 ppm STEL	50 ppm	100 ppm 150 ppm STEL	996.5	1.3 to 7.1%
Xylene	N.A.	100 ppm 150 ppm STEL	100 ppm 150 ppm STEL	100 ppm 150 ppm STEL	N.A.	1.0 to 7.0%

Notes:

[a] = Odor Thresholds for Chemicals with Established Occupational Health Standards, American Industrial Hygiene Association, 1989.

[b] = Permissible Exposure Limits (PELs) are legal standards enforced by OSHA and found in 29 CFR 1910.1000.

[c] = Threshold Limit Values, and Short Term Exposure Limits (TLVs and STELs) are recommended exposure guidelines developed by the American Conference for Governmental Industrial Hygienists (ACGIH), and published annually. For this site, *1993 -1994 Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices* was used.

[d] = Recommended Exposure Limits (RELs) are non-enforceable exposure guidelines developed by the National Institute of Occupational Safety and Health Administration (NIOSH) to support OSHA. *NIOSH Pocket Guide to Chemical Hazards, June 1990.*

NA = Substance information not available, or substance unlisted.

4.8B AOC 700, Golf Course Maintenance Building

AOC 700 is the site of a golf course maintenance building, Building 1646, located west of Avenue "D" and north of Hunt Street. This site has been designated for an RFI. Table 4-9c describes the sites.

Table 4-9c
AOC 700
Site Information and Description

Number	Description	Materials Generated or Stored
AOC 700 GOLF COURSE MAINTENANCE BUILDING	This structure was built in 1975. It has been used for lawnmower storage and repair and pesticide storage and mixing. The building is no longer being used and all chemicals and equipment have been removed.[1]	Sulfuric Acids Solvents Herbicides Pesticides Petroleum Hydrocarbons

Notes:
[1] Described in the *Final RCRA Facility Assessment*, Vol. V, June 1995.

Site Activities

Site activities will include coring, soil borings, and soil sampling. Field work for this site is described in Section 2.8 of this Work Plan.

Chemical Hazards and PPE Requirements

The COPCs at these sites include sulfuric acids solvents, pesticides, herbicides, and petroleum hydrocarbons. Table 4-9d lists exposure guidelines for contaminants of concern. This site has not been investigated previously. If additional contaminants of concern are discovered during the investigation, MSDSs will be immediately obtained, reviewed, and incorporated into the ZCHASP.

Table 4-9d
Exposure Guidelines For Expected Site Chemical Hazards - AOC 700

Chemical Name	Odor[a] Threshold	OSHA PEL[b]	ACGIH TLV[c]	NIOSH REL[d]	Auto-ignition Temp.(°F)	Flammable range (% by volume)
Acetone	100	750 ppm 1000 ppm STEL	750 ppm 1000 ppm STEL	250 ppm	869	2.6 to 12.8%
Benzene	4.68 ppm	1 ppm 5 ppm STEL	0.1 ppm Confirmed Human Carcinogen	0.1 ppm 1 ppm STEL Potential Occupational Carcinogen	1097	1.3 to 7.1%
Chlordane	N.A.	0.5 mg/m^3 - Skin	0.5 mg/m^3 - Skin	Potential Occupation Carcinogen	N.A.	N.A.
DDT	N.A.	1 mg/m^3 - Skin	1 mg/m^3	0.5 mg/m^3	N.A.	N.A.
DDE	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Dieldrin	0.041	0.25 mg/m^3 - Skin	0.25 mg/m^3 - Skin	Potential Occupational Carcinogen	N.A.	N.A.
Endrin	N.A.	0.1 mg/m^3 - Skin	0.1 mg/m^3 - Skin	N.A.	N.A.	N.A.
Ethylbenzene	140 ppm	100 ppm 125 ppm STEL	100 ppm 125 ppm STEL	N.A.	860	1.0 to 6.7%
Ethylene Glycol	N.A.	50 ppm - Ceiling	50 ppm - Ceiling	N.A.	751.8	3.2 to 15.3%
Kerosene	1	N.A.	N.A.	100 mg/m^3	444	0.7 to 5%
Lead	N.A.	0.05 mg/m^3	0.05 mg/m^3	0.1 mg/m^3	N.A.	N.A.
Malathion	N.A.	10 mg/m^3	10 mg/m^3 - Skin	15 mg/m^3	N.A.	N.A.
Methylene Chloride	214	500 ppm 1000 ppm Ceiling	50 ppm Suspected Human Carcinogen	Potential Occupational Carcinogen	1184	12 to 19%
Methyl Ethyl Ketone	10	200 ppm 300 ppm STEL	200 ppm 300 ppm STEL	200 ppm 300 ppm STEL	960	1.8 TO 11.5%
Parathion	N.A.	0.1 mg/m^3 - Skin	0.1 mg/m^3 - Skin	0.05 mg/m^3	N.A.	N.A.

Table 4-9d
Exposure Guidelines For Expected Site Chemical Hazards - AOC 700

Chemical Name	Odor[a] Threshold	OSHA PEL[b]	ACGIH TLV[c]	NIOSH REL[d]	Auto-ignition Temp.(°F)	Flammable range (% by volume)
Sulfuric Acid	N.A.	1 mg/m^3	1 mg/m^3 3 mg/m^3 - STEL	1 mg/m^3	N.A.	N.A.
Tetraethyl Lead	N.A.	0.075 mg/m^3 - Skin	0.1 mg/m^3 - Skin	<0.1 mg/m^3	229.8	1.8 to ?%
Trichloroethylene	0.5 to 176	50 ppm 200 ppm STEL	50 ppm 200 ppm STEL	25 ppm	770	11 to 41%
Toluene	40 ppm	100 ppm 150 ppm STEL	50 ppm	100 ppm 150 ppm STEL	996.5	1.3 to 7.1%
Xylene	N.A.	100 ppm 150 ppm STEL	100 ppm 150 ppm STEL	100 ppm 150 ppm STEL	N.A.	1.0 to 7.0%

Notes:

[a] = Odor Thresholds for Chemicals with Established Occupational Health Standards, American Industrial Hygiene Association, 1989.

[b] = Permissible Exposure Limits (PELs) are legal standards enforced by OSHA and found in 29 CFR 1910.1000.

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[d] = Recommended Exposure Limits (RELs) are non-enforceable exposure guidelines developed by the National Institute of Occupational Safety and Health Administration (NIOSH) to support OSHA. *NIOSH Pocket Guide to Chemical Hazards, June 1990.*

NA = Substance information not available, or substance unlisted.

The initial PPE level for invasive field activities performed at this AOC will be modified Level D. The AL for this site is a continuous PID reading of 5 ppm or greater in the breathing zone. If this occurs, the required PPE level shall be upgraded to Level C.

13.0 SIGNATORY REQUIREMENT

Condition I.E. of the Hazardous and Solid Waste Amendments (HSWA) portion of RCRA Part B Permit (EPA SCO 170 022 560) states: *All applications, reports, or information submitted to the Regional Administrator shall be signed and certified in accordance with 40 CFR §270.11.* The certification reads as follows:

I certify under penalty of law that this document and all attachments were pepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

D E Rice

for Commander, Charleston Naval Shipyard

1/26/96

Date

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for Commander, Charleston Naval Shipyard

1/26/96
Date